

Appl. No. 09/823,328
Amdt. Dated December 4, 2003
Reply to Office Action of June 4, 2003

Attorney Docket No. 81784.0233
Customer No.: 26021

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-5 (Cancelled).

Claim 6. (Currently Amended): A charge pump type power supply circuit comprising:

a first capacitor, a second capacitor and an output coupled to the second capacitor;

a first switch, wherein the first switch connects a first terminal of the first capacitor to either of an input voltage or a first terminal of the second capacitor;

a second switch, wherein the second switch connects a second terminal of the first capacitor to either of a second terminal of the second capacitor or the input voltage;

a control circuit generating a boosted voltage, wherein the control circuit controls switching of

the first switch to allow the first switch to alternatively connect the first terminal of the first capacitor to the input voltage or to the first terminal of the second capacitor,

and further controls switching of

the second switch to allow the second switch to alternatively connect the second terminal of the first capacitor to the input voltage or to the second terminal of the second capacitor,

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a power supply clock generated in accordance with a system clock and coupled to be provided to the first switch and the second switch, wherein the system clock is provided from outside of the charge pump type power supply circuit and is used for operation other than operating the power supply clock within the charge pump power supply circuit.

Claim 7. (Currently Amended): A charge pump type power supply circuit according to claim 6, wherein

said charge pump type power supply circuit includes means for selectively providing a power save control instruction;

said control circuit suspends the generation of said power supply clock in response to a power save control instruction; and

said control circuit suspends the generation of said boosted voltage in response to the suspension of said power supply clock.

Claim 8. (Currently Amended): A driving apparatus for a display device, comprising:

a driving circuit for generating a signal to allow a display section to display, said driving circuit being operated using a predetermined system clock external to the driving apparatus; and

a charge pump type power supply circuit for generating a supply voltage for a display device by boosting an input voltage to a voltage n times or $-n$ times said input voltage, said power supply circuit including a plurality of switches and a plurality of capacitors, the plurality of switches connecting a first one of the plurality of capacitors to either a second one of the plurality of capacitors or to an input voltage, wherein

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said driving circuit, generates a power supply clock internal to the charge pump type power supply circuit using said system clock, the power supply clock being provided to the plurality of switches; and

said power supply circuit generates said supply voltage by switch controlling said plurality of switches based on said power supply clock.

Claim 9. (Currently Amended): A driving apparatus for a display device according to claim 8, wherein,

said charge pump type power supply circuit includes means for selectively providing a power save control instruction;

said driving circuit suspends the generation of said power supply clock in response to a power save control instruction; and

said power supply circuit suspends the generation of said supply voltage in response to the suspension of the supply of said power supply clock.

Claim 10. (Currently Amended): A display device having a display section and a driving apparatus for driving the display section, wherein

said driving apparatus comprising:

a driving circuit for generating a signal to allow the display section to display, said driving circuit being operated using a predetermined system clock external to the driving circuit; and

a charge pump type power supply circuit for generating a supply voltage for said display device by boosting ~~the~~ an input voltage to a voltage n times or $-n$ times the input voltage, said charge pump type power supply circuit having a plurality of switches and a plurality of capacitors, the plurality of switches

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connecting a first one of the plurality of capacitors to either a second one of the plurality of capacitors or to an input voltage, wherein

said charge pump type power supply circuit includes means for selectively providing a power save control instruction;

said driving circuit further generates a power supply clock provided to the plurality of switches, the power supply clock being internal to the driving circuit, using said system clock, and suspends the generation of said power supply clock based on a power save control instruction; and

said power supply generates said supply voltage by switch controlling said plurality of switches based on said power supply clock and suspends the generation of said supply voltage in response to the suspension of the supply of said power supply clock.

Claim 11. (Previously Presented): The display device of claim 10, wherein the charge pump type power supply circuit and the driving circuit are provided in a semiconductor device and the plurality of capacitors are external to and connected to the semiconductor device as outer elements.

Claim 12. (Previously Presented): The display device of claim 10, wherein said display device includes at least two charge pump type power supply circuits; the driving circuit generates a separate power supply clock for each of the charge pump power supply circuits, and each power supply clock is suspended independently from the other power supply clocks based on the power save control instruction.

Claim 13. (Previously Presented): A charge pump type power supply circuit according to claim 6, wherein

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a supply voltage is generated by switch controlling said first switch and said second switch and boosting an input voltage to a voltage of n times or $-n$ times the input voltage based on said power supply clock produced by an integrated circuit using said system clock, said integrated circuit being operated using said system clock.

Claim 14. (Previously Presented): A charge pump type power supply circuit according to claim 6 wherein,

two boosted voltages are generated; and

two power supply clocks are generated to switch off the two boosted voltages at different times, whereby a power supply of a panel is switched off after a power supply for a driving circuit is switched off.